

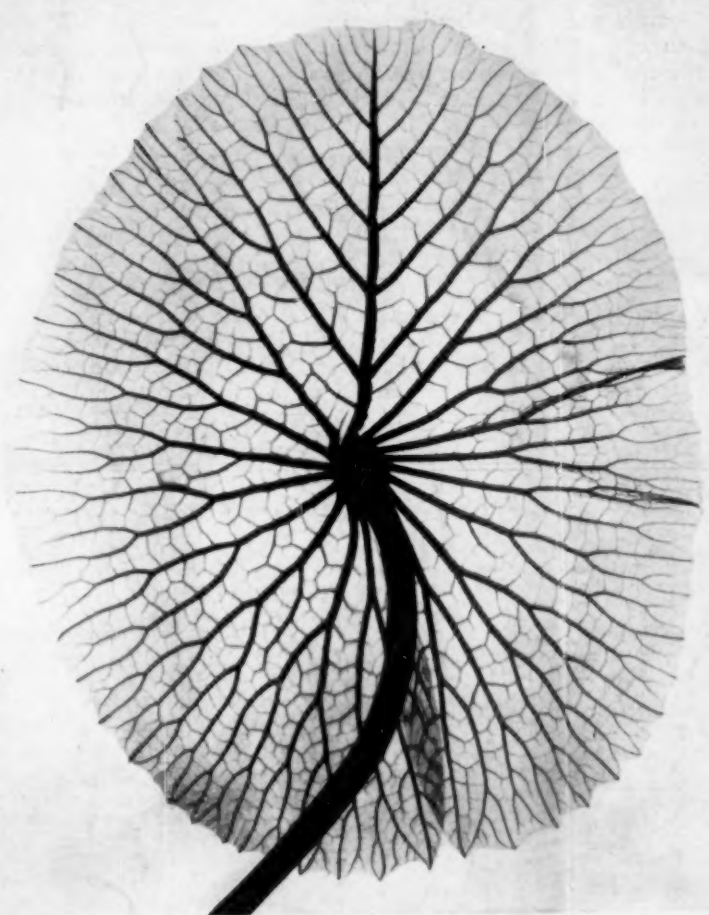
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



OCTOBER 10, 1936


Looking Within
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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XXX

No. 809

The Weekly  Summary of

Current Science

Published Every Saturday by

SCIENCE SERVICE

2101 Constitution Avenue

Washington, D. C.

THE INSTITUTION FOR THE POPULARIZATION OF SCIENCE organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year to regular subscription rate to cover postage.

Members of the American Association for the Advancement of Science have the privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

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Cable address: Scienservc, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices.

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DO YOU KNOW?

A chow dog's tongue is almost black.

Most snakes are good swimmers.

Pekinese dogs are pictured on some of China's ancient pottery art.

Beavers are the largest rodents in North America.

East Africa has a breed of oxen with horns that spread more than eight feet from tip to tip.

In the search for motor fuels, Italy is finding unexpectedly good results with anhydrous ammonia.

Among scientists recently honored on postage stamps are Darwin, von Guericke, and Nikola Tesla.

A tuberculosis center with 1,400 beds is to be built in Buenos Aires, Argentina, at a cost of almost \$2,000,000.

Why tooth decay occurs so frequently in boys and girls in their teens is a dental problem not yet solved.

Most animals that climb trees descend tail first, but a few kinds, such as squirrels and chipmunks, climb down head first.

Numerous strings of beads made of ostrich egg shell are considered practically enough of a costume by Ovambo women in Southwest Africa.

Fire scenes in the movies can be kept cool by a chemical trick of combining inflammable and non-inflammable substances.

By a new method of testing peach seed, a nurseryman can tell within a week whether seed will germinate, instead of waiting almost three months as has been necessary.

A Franciscan expedition digging on top of Mount Nebo has found a fourth century Christian church that once stood on the famous Bible site.

Although naturalists recognize 15 different races of fox sparrows in the West, the differences are so subtle that even experts may have to compare a bird with museum specimens to identify it.

The Quetta nectarine from India is adapting itself to commercial growing in California, and should ripen successfully as far north as Iowa and Pennsylvania.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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MEDICINE-IMMUNOLOGY

Better Pneumonia Treatment Made Possible by Research

Antibody Is a Protein, Experiments In China and at Rockefeller Institute Indicate; Action Not Specific

IMPROVED treatment of Type III pneumonia is now possible as a result of experiments made in China and reported in the current issue of the journal *Science* (Oct. 2).

The antibody which helps fight pneumonia germs has been isolated in immunologically pure form, Drs. Bacon F. Chow and Hsien Wu of Peiping Union Medical College report. The precipitate of antibody which they obtained is much more effective in fighting pneumonia germs than the anti-pneumonia serums now in use, it appears from their report. This is of particular importance in connection with Type III pneumonia, the serum for which has a very low antibody content.

While this is the practical significance of the isolation of this antibody, the work is also significant because it gives scientists a much better means of studying the mechanism of antibody action.

The much mooted question of the nature of antibodies is also settled by this research, in the opinion of Drs. Chow and Wu. They report that their findings "leave little doubt that the antibody itself is a protein." This means it belongs chemically in a class with meat and eggs, rather than with the fats or the sugar and starch group. Scientists have not been sure whether disease-fighting antibodies were themselves protein in nature or whether they were something carried by protein.

"On the practical side, the preparation of pure antibody places in the hands of clinicians therapeutic agents where serum therapy was not practical before, e.g., in Type III pneumonia, the anti-serum for which has a low antibody content," the scientists state.

Type III is one of the 32 or more types of pneumonia which are classified according to the particular pneumonia germ causing the disease. Success in treating the disease depends on determining early in the illness the type of germ responsible and giving the corresponding serum. Types I and II pneumonia germs cause over half of all the cases of the illness. Type III causes less than one-tenth. The serums for Types I and II have been more effective than

those for the other types. Improvement in the serums for these types is also indicated by Drs. Chow and Wu.

The true nature of antibodies had already been brought several steps nearer definition by studies just reported by Dr. Ralph W. G. Wyckoff of the Rockefeller Institute for Medical Research (*Science*, Sept. 25).

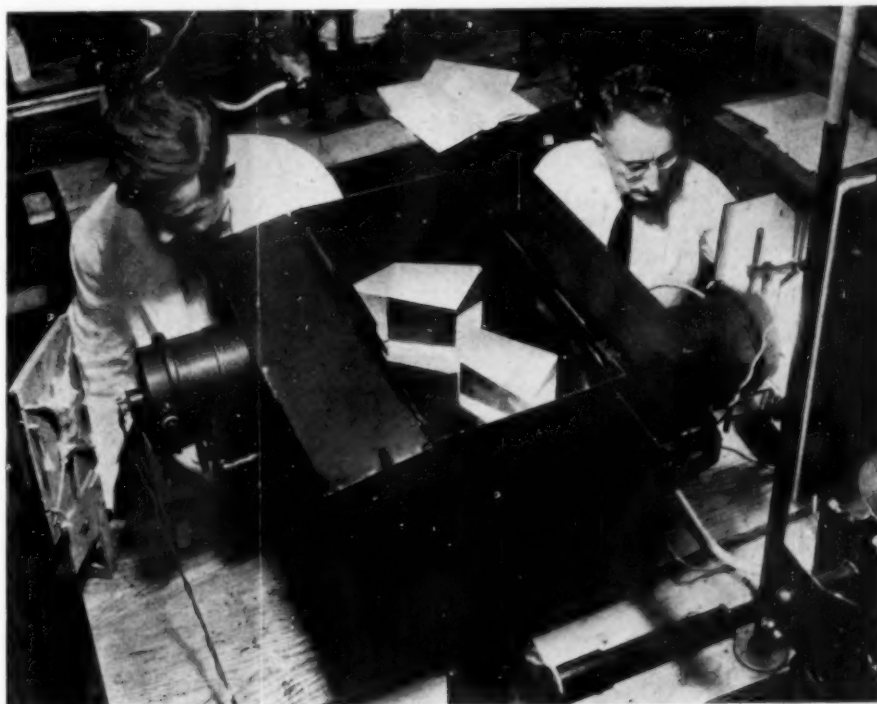
Like Drs. Chow and Wu, Dr. Wyckoff worked with antibodies from Type I pneumonia serum which saves lives of pneumonia patients by augmenting their own dwindling supply of disease-fighting antibodies. A concentrate of material containing the antibodies was obtained by whirling the serum in an ultracentrifuge, which separated the heavier from the lighter parts of the

serum. The heavier layer at the bottom contained the antibodies and proved to be a mass of protein molecules of a definite nature.

Two possibilities concerning the nature of this substance have still to be investigated. The protein molecules associated with the antibodies may be made or freed in excess during immunization or vaccination, in order that there may be plenty of it present to fix all the antibody activity that may develop. Or the protein molecules may be the antibodies themselves.

If this is the case, as the studies of Drs. Chow and Wu now seem to prove, current theories about the specificity of antibodies are upset. According to theory, each antibody is specific for the antigen produced by a certain disease germ and fights or protects effectively only against that germ. But Dr. Wyckoff's studies show, in his opinion, that a single protein molecule can act like more than one antibody. If these protein molecules are the antibodies themselves, a single antibody concentrate, such as many protective serums and vaccines now used are, might give protection against more than one disease.

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PLENTY OF ULTRAVIOLET

New light on the puzzling problem of why green vegetables are notoriously lacking in vitamin D is coming from experiments at the Albany Medical College by Prof. Arthur Knudson (left) and Frank Benford of the General Electric Co. Using this device, which splits up ultraviolet radiation into any wavelengths wanted for study, the scientists have found that intermittent or moderate doses of ultraviolet rays will aid the formation of vitamin D but that intense and prolonged exposure such as plants receive will destroy the vitamin.

ARCHAEOLOGY

Darts With Elephant Bones Prove Americans' Antiquity

PREHISTORIC elephants, hunted to death by cunningly shaped primitive darts, have been unearthed in New Mexico, proving at last to scientific satisfaction that America was inhabited as long ago as 8000 B. C.

The discovery, which places America's famous Folsom Men more definitely than ever before in a niche of time, was made by a joint archaeological expedition directed by the Academy of Natural Sciences of Philadelphia, the Carnegie Institution of Washington, and the University Museum, Philadelphia. The site of the discovery is Blackwater Draw, between Portales and Clovis.

Dr. Edgar B. Howard, leader of the expedition, reported finding at the site bones of ponderous mammoths with stone spear points made by man associated beyond doubt with them. One of the ancient hunter's weapons lay under a vertebra, another under a shoulder blade, and another between the forelimbs of a beast. The prehistoric ele-

phants thus slain were obviously trapped in a bog, where they floundered until the eager big game hunters could dispatch them with their pointed spears.

Bone points, the first of their kind ever discovered in connection with prehistoric elephants or with America's ancient Folsom Men, were unearthed at the scene. One of these bone points rested on the base of a mammoth's tusk.

The antiquity of the event, about 10,000 years ago, is estimated on geological and climatological evidence. The remains of the hunt, with the lost and discarded weapons, were buried through the centuries by hard silt and several feet of sand, and remained undisturbed.

Scientific witnesses attending the excavation of the bones and weapons included Dr. Ernst Antevs, geologist of the Carnegie Institution, Dr. Harold Colton of the Museum of Northern Arizona, and Dr. Frederica de Laguna, archaeologist of the University Museum.

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ANTHROPOLOGY

Alaskan Mummy Caves Shed Light on Ancient North

DISCOVERY of important mummy caves, where prehistoric people of the North hid away their dead, is a signal achievement of the Smithsonian Institution's expedition to Alaska, just returned.

Dr. Ales Hrdlicka, leader of the anthropological expedition, and his four associates braved fog hazards and rocky barriers to explore two caves which they believed would contain bundled mummies of Alaska's early Aleutian Islanders.

These caves are no more than crevices in rocky mazes of the Aleutian Islands, Dr. Hrdlicka explained. A first attempt to reach one cave failed due to heavy fog that shut out the island and the two great volcanoes nearby. With the aid of the Coast Guard, the party returned and, finding that here were indeed buried many ancient people, both adults and children, they began to work as fast as

they could to remove mummy bundles from the confusion of fallen rock and debris. Foxes in the cave tomb had added to the damage of time.

"We worked with our hands," said Dr. Hrdlicka. "Tools were of no use. We had no time to think of resting or eating, for if fog settled down we would be marooned, perhaps for days."

By afternoon, the sea was running to a considerable swell, and the workers made haste to get away. All material collected had to be passed by relay in sacks from one man to another for three-quarters of a mile to the beach where the boat was waiting.

Collections from the two caves, now awaiting scientific examination, filled 20 large barrels.

"They promise, from what has already been seen, to be of signal importance," said Dr. Hrdlicka.

It is already astonishingly evident, he

said, that these burials reveal art such as has never before been known to exist in the Far North. Baskets and mats that protected the mummy bundles are worked in fine stitchery in red, rich brown, and black.

Some of the mummies, in excellent preservation, are expected to advance knowledge of the way these Eskimo-like people lived, as well as their physical types. The Aleut custom of bundling dried bodies in grass mats and skins and hiding them in secret cave tombs has been known to science for more than 50 years, but the limited specimens found by explorers have stirred anthropologists to the realization that they had still much to learn about life in the prehistoric Far North.

From excavations in the Aleutian Islands this summer, Dr. Hrdlicka is convinced that these stepping-stone islands that swing out from Alaska toward Asia were once thickly inhabited. The islands contain hundreds of sites, he has learned, many of them pre-Russian. And in the days when America was being populated by its original "natives," these Aleutian Islands were probably a secondary highway which carried wanderers into this continent, Dr. Hrdlicka now believes. Bering Strait, farther north, has long been recognized as the primary highway of the ancient migration, but the Aleutian Islands have heretofore been considered a mere side-track into which some groups drifted from the Alaskan side.

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CHEMISTRY

Glucose Is Source of New Type of Explosive

CORN may find still another extensive industrial use, as ultimate source of a new type of explosive. This outlook is opened up by researches of a young Atlas Powder Company chemist, James A. Frorer.

The explosive itself is made by nitrating a hitherto rare chemical known as mannitol. Mannitol bears much the same relation to the rare sugar mannite that glycerin bears to glucose. Mannite, hitherto expensive even in small quantities, can now be made in tons from glucose or corn sugar, which in turn is made from cornstarch.

Nitrated mannitol, which is chemically more or less analogous to nitroglycerin, is expected to be of industrial rather than military importance as an explosive. Mannitol may also find an even greater usefulness in electrical condensers.

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MEDICINE

X-Rays Cure Rare Disease, Changing Girl's Personality

Cleveland Meeting Hears Reports of Life-Saving Uses For Roentgen Rays, New Techniques, Scientific Methods

HOW X-RAY treatments of the pituitary gland lying deep within the head transformed a fat, weak, bearded, sexless person into "an active, attractive, wide-awake young woman" was reported by Dr. Merrill C. Sosman of the Peter Bent Brigham Hospital, Boston, to the American Roentgen Ray Society meeting in Cleveland, Ohio.

This patient and two others reported by Dr. Sosman were suffering from a rare disease known as pituitary basophilism. The disease, discovered by Dr. Harvey Cushing, noted brain surgeon, is caused by a tumor affecting certain cells of the powerful pituitary gland. Because the pituitary is the leader of the endocrine gland orchestra, disease of the pituitary affects all the other glands and causes striking disorders and changes throughout the body and in the personality.

Other tumors of the pituitary gland are not so rare and are more easily detected than this particular one, Dr. Sosman pointed out. In fact, the symptoms of this disease are so many that disorder of a number of other glands may appear to be the cause of the patient's illness. If further study shows that X-ray treatments will cure or relieve the condition, as Dr. Sosman's results indicate, the diagnosis can be confirmed by giving such treatments and noting the results, it was pointed out.

Striking Results

Of the three patients reported by Dr. Sosman, one died of brain hemorrhage before any results of the treatment were apparent. The other two showed "striking results with practically complete return to normal."

Chief symptoms of this rare malady, Dr. Sosman said, are: peculiar, painful fatness of the face, neck and trunk; excessive, male-like hair on the face, arms and legs of female patients, and a thinning of the normal head hair; softening and frequently spontaneous fractures of the bones, due to excessive excretion of calcium; twisting of the spine, backache and actual loss of height because of the same bone condition; excess red

blood cells in the hands and feet and particularly in the face, which becomes so swollen and red that it "seems about to burst like an over-ripe tomato;" weakness, becoming so bad the patient is bedridden; high blood pressure, sometimes resulting in a fatal hemorrhage into the brain; and a low basal metabolic rate. Sexual changes may also occur.

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OBSTETRICS

Babies' Heads Measured Before Their Birth

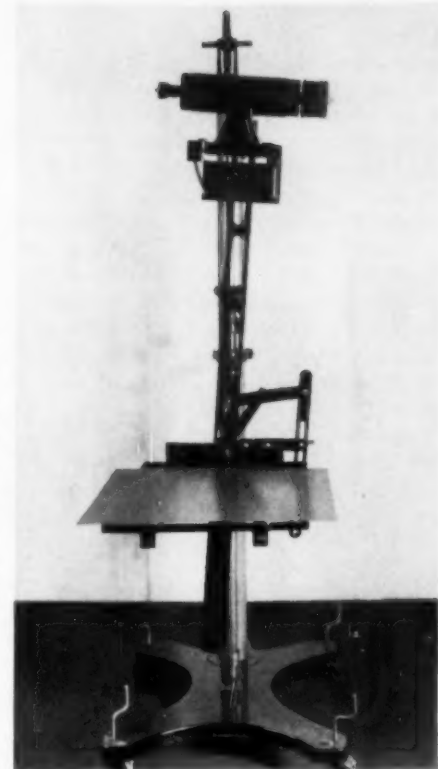
A COMBINATION of X-rays, geometry and World War medicine is helping to make life safer for mothers and their babies.

How the combination works was demonstrated by Dr. Paul C. Hodges of the University of Chicago in an exhibit at the meeting of the American Roentgen Ray Society.

The starting point was a method devised by Dr. Mackenzie Davidson of England to locate bits of shell and other foreign matter blown into the bodies of soldiers during the War. X-ray pictures of the same bit of shell were taken from two different angles and the resulting films laid on top of each other in proper position. The distance between the outlines of the object in the two pictures is measured, and by geometrical calculations, the size of the object and its distance from the surface of the body can be determined.

Dr. Hodges has applied this method, with some improvements, to measuring the size of the head of the unborn baby and the bony outlet through which it must pass. If the head is too large for outlet, the physician knows that it will be dangerous for the mother to have her baby by natural processes and can plan for a surgical operation. To assist in getting accurate measurements, Dr. Hodges has devised a light-weight frame which fits snugly around the mother's back and sides while the X-ray pictures are being taken.

In addition to getting accurate knowl-



TOMOGRAPH

This is a new X-ray dissecting machine exhibited by Dr. J. Robert Andrews of University Hospitals, Cleveland, at the meeting of the American Roentgen Ray Society. Operating on a lever principle, the X-ray tube and the film rotate about any desired layer of the body, giving a picture which is an image of that layer only. Ordinary X-ray pictures give images, superimposed on each other, of all parts through which the X-rays pass and one part may obscure others. The tomograph is expected to be particularly helpful in diagnosing brain tumors or other diseased conditions in the head or in the chest which at present are difficult to see clearly with ordinary X-ray methods. The principle of the tomograph was developed in Germany. Dr. Andrews' experimental machine, the first in this country, was designed by Robert J. Stava.

edge of the size of the baby's head in relation to the birth canal, Dr. Hodges has combined X-rays, geometry and algebra to determine the age of the unborn child more accurately than is possible by other methods of calculation. This is determined from back-to-front and side-to-side measurements of the baby's head. The head measurements are compared with tables worked out by two University of Minnesota scientists, Drs. L. A. Calkins and R. E. Scammon, who measured hundreds of skulls of babies that had died before birth, and cor-

related these with the age of the unborn babies.

In cases where the head is deformed or cannot be measured by X-ray methods before birth, the length of the thigh is used to determine age. This measurement is possible as a result of research by Dr. Ruth Stocking in Dr. Hodges' laboratory. Dr. Stocking worked out a way of calculating the length of the thigh from measurement of the length of the shaft, since this is all that shows in X-ray pictures of unborn babies, the ends of whose thigh bones are not developed enough to show in X-ray pictures.

Knowing the age of the unborn child, the physician can tell not only when the child will be born, but also whether or not the child will be born alive. If the age based on the mother's record is 35 weeks, for example, and the age determined from X-ray measurements is only 25 weeks, it indicates that the child is dead.

Physicians have used other methods of determining these important facts about mothers and unborn babies, but the X-ray methods are more and more in demand, Dr. Hodges pointed out.

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MEDICINE

Tuberculosis Methods May Be Useful With Arthritis

SOME of the methods used in treating tuberculosis may in future be applied to treating arthritis, although the two diseases are not related, Dr. Robert M. Stecher of Western Reserve University told the meeting. He showed photographs and X-ray pictures of dozens of pairs of hands afflicted with various types of arthritis.

This exhibit looked like a fortune-teller's nightmaric, except that the pictures show the backs instead of the palms of the hands. The photographs show the swellings, deformities, and crippling of the hands and the X-ray pictures show the underlying destruction of bones and joints. Some of the hands were crippled and painful and the bones roughened and worn away by infections, among them gonorrhea.

In these infectious conditions, fever treatment by the Kettering machine for inducing very high temperature in the patient is helpful.

In another type of arthritis the cause is not so well known. In these cases, Dr. Stecher pointed out, the patient is sick and not merely having trouble with his hands, though his general sickness

is not always considered in treating his arthritis. For such patients Dr. Stecher believes the treatment should be modelled after methods used in tuberculosis. The patient should be put to bed, given plenty of food and sunshine. It might help him to be sent west where the climate is dry and even. Too often, these patients insist on going to work and carrying on as many activities as their painful or crippled joints will allow.

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GENERAL SCIENCE

Scientific Methods Essential To Solution of Problems

THE future of mankind depends on man's learning to use the method the scientist uses in solving his problems.

This was the message of physics to medical X-ray science as conveyed by Prof. Robert A. Millikan, California Institute of Technology head and noted cosmic ray investigator, to the meeting of the American Roentgen Ray Society.

"Man must learn the scientific mode of approach before he will ever solve the worst of his social or governmental ills," Prof. Millikan declared.

The method of science, Prof. Millikan explained, is always to utilize the knowledge of the past as a platform from which to make advances into the future. In every single case the scientist starts with the accumulated knowledge of the past and pushes a little further along, and then from this slightly advanced platform builds still a little further, and so on and on, always pushing ahead from the last platform of all past knowledge.

Prof. Millikan sketched briefly the way in which this scientific method of approach was used in exploring the field of electromagnetic radiation from X-rays and ultraviolet rays to cosmic rays. The knowledge gained in this field is of tremendous importance and usefulness, but the method by which it was gained is even more important, Prof. Millikan emphasized.

He declared that this scientific method of approach is "vastly more important for the future of the race than any particular bread-and-butter application in the whole field of radiation, no matter how important that field as shown by the fact that enormous industries—the whole communications industry and sound pictures, for example—have come out of it."

Prof. Millikan surveyed the field of radiation and described the ranges of particular interest to medical men. Among these is the whole range of

X-ray and gamma ray frequency, the main use of which is "combating mankind's most terrible scourge, cancer." This runs from a frequency in electron volts of about 12,000 up to 1,200,000 electron volts, which is the highest frequency which has been generated by an X-ray tube and used continuously for cancer treatment.

These high potential X-rays are particularly appropriate for deep-seated cancers, Prof. Millikan reminded the doctors, the low potential tubes being successfully used to treat superficial cancers.

"It is not too much to say," Prof. Millikan continued, "that the best of medical authorities agree that radiation is the most potent agent we now have for combatting the scourge of cancer, not even excepting surgery."

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ROENTGENOLOGY

Doctors Warned of Danger In Use of Diagnosis Aid

POSSIBLE danger in the use of thorotrast, a radioactive substance, in diagnosis was pointed out by Dr. Robert B. Taft of Charleston, S. C. Thorotrast is injected to make visible on X-ray pictures parts of the body that could not otherwise be seen and thus helps the physician detect disease conditions. Because its radioactivity is slight it is considered harmless to the patient and so far no adverse effects have been reported.

Dr. Taft devised a method of determining the radioactivity of one dose of thorotrast in the patient's body and found it gives off gamma rays equivalent to 1.37 micrograms of radium. Small as this may seem, it is the amount found in the bodies of the girls who died of radium poisoning contracted when they painted radium on watch dials. Dr. Taft, in making his preliminary report, said he expected to continue his studies but he feels the evidence already obtained shows that those who use thorotrast are on "dangerous ground."

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ROENTGENOLOGY

New Type X-Ray Camera For Analysis of Movement

FIRST use in the United States of a new kind of X-ray camera called the kymograph was reported by Drs. Wendell G. Scott and Sherwood Moore of

Washington University School of Medicine, St. Louis, to the meeting.

With this machine physicians will be able to analyze the complex movements involved in breathing and get a better idea of what is wrong in various diseases of the chest such as pneumonia, tuberculosis, cysts, abscesses and tumors of the lungs and even some abdominal disorders. Kymograph pictures are taken through a lead grid arrangement which gives an effect equivalent to a photograph of a garden through a picket fence.

Kymograph pictures look like badly blurred films because they are long exposures and the movements of breathing cause the blurs. The grid arrangement, however, throws lines on the film which are used to measure the amount of blurring and thus the amount of movement. The movements are made by the lungs, diaphragm, heart and spine during breathing. When disease causes a change in any of these movements, the kymograph records it and thus helps the physician diagnose the condition.

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GEOLOGY

Earth Gains Pound an Hour On Diet of Shooting Stars

OLD Mother Earth is putting on weight at the rate of nearly a pound an hour, on a diet consisting of stone and iron. She makes no secret of it either, for at least the larger mouthfuls are signalled by shooting stars.

How fast the earth receives new matter from interstellar space was worked out from the reports presented by Dr. F. G. Watson and Dr. J. L. Greenstein, both of Harvard College Observatory, to the American Astronomical Society.

Dr. Watson made a special study of the rate of fall of what might be called micro-meteors, which are bits of cosmic dust gathered in by the earth as it speeds through space, but which are so small that they do not make the brilliant flashes that mark the capture of their larger brethren, the meteors or shooting stars.

The brilliant shooting stars on which young people "make a wish" are caused by the evaporation in the high upper atmosphere of bits of stone or iron, the biggest about the size of a pinhead. Dr. Watson's micro-meteors are much smaller than that, the smallest detected with his special instruments being about a hundredth of a millimeter in diameter. That is about the size of a yeast cell, or a good, fat, outsize germ.

Dr. Watson's studies showed that every day the earth's atmosphere receives approximately one hundred thousand million meteors and micro-meteors. Their total mass comes to an estimated ten kilograms daily. A kilogram is a little over two pounds, so that the hourly rate is somewhere around one pound.

Dr. Greenstein conducted his research on similar drifting solid particles as

they exist in the far interstellar spaces, for they seem to be everywhere in the astronomically explorable universe. Particularly thick masses of them cut off light from distant stars, making the dark nebulae, or "coal sacks," that have proved so puzzling to astronomers.

A young woman astronomer at the Harvard Observatory, Miss Henrietta Swope, reported on the behavior of one of the strangest stars ever studied in the sky. Until about 1928, it was a "steady" star, but then it turned into what is called a Cepheid variable, increasing and decreasing its brilliancy at regular intervals. There are many variable stars of this type, but none like this one; for in the first place no star has ever been known to change from a steady, to a variable before, and in the second place no Cepheid variable has ever been known to change its period. And Miss Swope's unique star has done just that. In 1928, when it first began "acting up," its period from bright through dim and back to bright again was fourteen days. Now it is twenty-one. Nobody has any explanation for this strange behavior.

Miss Swope is a daughter of Gerald Swope of the General Electric Company.

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Most babies are well when they are born, says the United States Children's Bureau.



STUDY OIL FILMS

Oil films so thin that a mere ounce of oil would cover a 15- to 20-acre pond have been produced with this new polymolecular apparatus devised by Dr. W. D. Harkins (standing) and Dr. Robert J. Myers (sitting) of the University of Chicago. These chemists have discovered that the molecules that make up films can stand on end. Or they can lie over more and take up more room. Or they can lie down completely. "Lying-down" molecules of an ounce of oil will cover the 15 to 20 acres, while the upright molecular films will cover only $3\frac{1}{2}$ acres of water surface. The experiments are expected to throw new light on the films for lubrication and other uses. (See SNL, Sept. 19.)

GEOLOGY

Pacific Once Over Wyoming, Ancient Skeleton Shows

PACIFIC Ocean waters extended over Wyoming, some 26 million years ago, is the evidence of a fossil skeleton identified by Prof. E. C. Case of the University of Michigan.

The animal was a nothosaur, an amphibious relative of the dinosaurs, about six feet long. It had a strong tail that drove it through the water, and long legs that were most useful in swimming but could also be used on land. It probably lived most of the time in the sea, but came ashore to take sunbaths and to lay its eggs.

The skeleton now at the University, was sent in by Dr. S. H. Knight, director of the Wyoming Geological Survey. It was found near Casper, Wyo., by Don Allsen, University of Wyoming student. It is the first skeleton of its kind to be found in America, all previously known specimens having been reported from Europe.

Science News Letter, October 10, 1936

ARCHAEOLOGY

Barbecue Scene Unearthed Near Fort Collins, Colo.

AN EARLY American barbecue scene, early indeed since it happened thousands of years ago, has been unearthed in Colorado, where the oldest people of America camped and feasted.

Remains of the ancient picnicking are the latest discovery from the now famous site near Fort Collins, Colorado, where a Smithsonian Institution expedition is digging out the earliest known settlement of human beings in the entire New World.

Dr. Frank H. H. Roberts, Jr., who has just returned from the prehistoric site, found the evidence—a jumbled mass of meat bones flung aside, and charcoal and ashes of a great fire where bison and other big game animals were roasted for the great feast.

New light on the industry that went on at this place, perhaps 10,000 years ago, has also been uncovered by Dr. Roberts' expedition. Folsom Men, as science calls the earliest known inhabitants of America, did not merely camp at this site and move on. They lived and worked there, turning out hunting spears, knives, choppers and other stone implements, and leaving debris of stone scraps and discards on the ground.

Dr. Roberts has unearthed hundreds

of stone tools and weapons from the layer of ground in which they are now buried. This season his collection of Folsom Man's handiwork has shown that the oldest Americans were more versatile than had been heretofore suspected, in shaping stone to useful forms.

He has also learned more about the methods used in this most ancient of American factories. The Folsom Men did not ordinarily work at a chunk of rock until they had knocked off enough to leave a weapon. They reserved that simple technique for big heavy smashing tools, for cracking bone. But for cutting tools they preferred to knock off large flakes from a piece of stone, and these flakes, rather than the original stone itself, were then finished into sharp blades.

The latter method, Dr. Roberts explains, is considered more advanced as Stone Age culture goes, and Folsom Man's preference for the flake technique suggests his progress in stone industry.

New evidence regarding a mysterious type of old stone weapon known as Yuma points, after the place where they were first described, has come to light from this same camp site in Colorado, Dr. Roberts reports. Scientists have long debated whether these slender Yuma points were older than Folsom Man's most typical weapon, a grooved stone blade. Now, Dr. Roberts has found a number of Yuma points in a layer of earth 17 inches above the remains of Folsom Man's existence.

"So far as this site is concerned," Dr. Roberts concludes, "Yuma points were made later than the Folsom type of weapon."

Science News Letter, October 10, 1936

SEISMOLOGY

Earthquake off Oregon Recorded on Seismographs

AN EARTHQUAKE shook the Pacific Ocean bottom about 300 miles off the Oregon coast early Friday morning, Sept. 25. Seismologists of the U. S. Coast and Geodetic Survey made a preliminary determination of the epicenter as in latitude 43 degrees north, longitude 130 degrees west, on the basis of data supplied through Science Service. Origin was 4:53.4 a.m., Pacific Standard Time.

Observatories reporting were those of Fordham University, New York City; the Dominion Meteorological Observatory, Victoria, B. C.; and the U. S. Coast and Geodetic Survey, Tucson, Ariz.

Science News Letter, October 10, 1936

IN SCIENCE

BACTERIOLOGY

Ultramicroscopic Virus Blamed for Paper Decay

DECAY of valuable books, documents and other papers is now blamed on a filterable virus, belonging to the same class of ultramicroscopic organisms (if they really are organisms) that cause such diseases as smallpox, hog cholera, and leaf mosaic in plants.

Discovery of a paper-decaying virus is reported by Prof. N. P. Tikhonov and S. L. Zaitsev of the Academy of Sciences of the USSR. The two scientists conducted their researches in the Academy's laboratory for the preservation and restoration of documents. A sheet of new white paper kept for several months alongside of a virus-infected document loses about 80 per cent of its durability.

Science News Letter, October 10, 1936

PLANT PATHOLOGY

Tobacco Ill's Defeat Promised by Research

TOBACCO mosaic, destructive plant disease that costs tobacco growers the world over many millions of dollars annually, is a step nearer final defeat as a result of research work done by Rupert J. Best of the Waite Agricultural Research Institute of South Australia.

Mr. Best based his experiments on results obtained by Dr. A. W. Petre of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y. Dr. Petre had been able to precipitate the virus causing the disease from a solution obtained from infected plants by using various chemical substances.

Mr. Best found that other proteins were being precipitated by this method as well as the virus. He set to work to find out the "isoelectric" point of the virus. This point is a measure of the acidity of the solution at which only the virus will be precipitated by the various chemical agents used by Dr. Petre.

By this method Mr. Best has obtained a precipitate of 99 per cent of the virus and he is carrying out further investigations into its chemical nature.

Science News Letter, October 10, 1936

FREE FIELDS

VITAL STATISTICS

Dozen Years Added to Average Length of Life

ELEVEN years have been added to the average man's life and 12 years to the life of the average woman, it is revealed by life tables of the U. S. Bureau of the Census.

At the beginning of the present century, the average length of life in the United States was 48 years for white men. Now, these new figures give an average life length of 59 years. For women the average lifetime in 1900 was 51 years. Now it is nearly 63 years.

The added years of life are credited to "improved sanitation, higher standard of living, labor-saving inventions in the homes and the advances made in education and in the science and practice of medicine and surgery."

Science News Letter, October 10, 1936

PHYSIOLOGY

Drunkenness Is Caused By Lack of Oxygen

WHY does alcohol make the imbibor drunk? That is a question which has puzzled physiologists for many years. The answer is that it deprives the body of oxygen, Drs. R. A. McFarland of Columbia University, and A. L. Barach of the College of Physicians and Surgeons, New York City, conclude as a result of experiments reported in the *American Journal of the Medical Sciences*. They suggest treatment with combined oxygen and carbon dioxide.

The symptoms of drunkenness are familiar enough. The "drunk" sways on his feet. He lacks control over his movements. And, in addition, he may become irrational and lose his capacity for self-criticism, association, and memory. Physiologists have noticed a striking similarity between these symptoms and those of the mountain climber who suffers from altitude sickness and the flyer at high altitudes who is not getting enough oxygen.

Twenty-three students, all but two of them non-drinkers, volunteered to serve as subjects for Dr. McFarland and Dr.

Barach. They went without breakfast to the laboratory and there were treated to a big tumbler full of alcohol, orange juice, and oil of juniper. Control subjects had a similarly flavored drink without the alcohol. Unfortunately, they were not always fooled. They missed the "kick."

Tests were made to determine the amount of alcohol and lactic acid in the blood, and psychological tests to discover the mental condition of each subject. Treatment with oxygen and carbon dioxide lowered the blood's alcohol and lactic acid and improved the mental and motor ability in all but five of the 23 subjects, the experimenters found.

In a number of the cases, the decrease in blood alcohol was more than 50 per cent. Breathing of excess oxygen also tended to decrease the variations in pulse rate and respiration.

Science News Letter, October 10, 1936

PHYSIOLOGY

Good Mountain Climbers Need Plenty of Red Blood

IT TAKES red-blooded men—or other animals—to stand high altitudes without getting mountainsick or experiencing other unpleasant symptoms when they first reach the heights, it appears from studies carried out as part of the program of the International High Altitude Expedition.

Lack of oxygen in the atmosphere on a mountain top is responsible for most of the unpleasant symptoms. Persons who can enjoy their meals and be in a cheerful frame of mind when first climbing to oxygen-rare high altitudes owe this ability to the stuff which gives the red color to their blood, hemoglobin.

Hemoglobin besides coloring blood red plays the vital role of oxygen carrier between lungs and the rest of the body. Everyone has hemoglobin in his blood, but apparently some kinds of hemoglobin are more efficient at grasping oxygen from the air as it is breathed into the lungs.

Evidence for this was obtained in studies of mountain animals, such as the viscacha, the llama and the vicuña of the Andean highlands, and reported by Drs. F. G. Hall of Duke University, D. B. Dill of Harvard University, and E. S. Guzmán Barrón of the University of Chicago to the *Journal of Cellular and Comparative Physiology* (Vol. 18, No. 3). These animals all had hemoglobin which was more avid for oxygen, and also had more hemoglobin in each red blood cell, than did animals that live at sea level.

Science News Letter, October 10, 1936

ROENTGENOLOGY

X-Rays Bring Out Full Inner Beauty of Leaves

See Front Cover

X-RAYS are more than simply instruments for detecting injuries, combating certain diseases, and examining metals and other industrial materials. In the hands of a technician who is also an artist, they become the medium of an exquisitely developed expression of beauty.

Pioneer practitioner of this unique X-ray art is Mrs. Hazel Engelbrecht of Des Moines. Her daily work is making diagnostic X-ray photographs for physicians and surgeons and dentists; her all-absorbing hobby is the making of X-ray photographs that bring out, in the same picture, both surface and hidden beauty. The picture of the water-lily leaf shown on the cover of this issue of the *SCIENCE NEWS LETTER*, for example, gives an idea, not attainable in any other way, of the remarkable network of veins that are at once canals of the plant's life-juices and girders to keep the leaf-blade properly spread and supported.

Science News Letter, October 10, 1936

CHEMISTRY

Perkin and Industry Medals Given to Noted Chemists

THOMAS MIDGLEY, Jr., of Dayton and Detroit, whose research created the ethyl gasoline industry, and Dr. Walter S. Landis, of New York, leader in fertilizer research, are to be given high chemical honors.

The Society of Chemical Industry's American section has just awarded its 1937 Perkin medal to Mr. Midgley and its 1936 Chemical Industry medal to Dr. Landis.

Tetraethyl lead, which Mr. Midgley applied to make motor fuel anti-knock, adds, the prize committee announced, "forty times as much horsepower annually to American civilization as that which will be supplied by Boulder Dam." His more recent discovery of non-toxic refrigerants is described as equally fundamental in refrigeration and air conditioning.

Dr. Landis is vice-president of the American Cyanamid Company, and he has successfully attacked research problems dealing with nitrogen, cyanamid, cyanide, ammonia, nitric acid, phosphate, hydrogen, alloys, etc. He was responsible for the first large scale production of argon, rare gas used in lamps.

Science News Letter, October 10, 1936

AGRICULTURE

King Cotton Won't Abdicate

**Plenty of Troubles Have Beset Southland's Monarch
But Researchers Aid by Discovering New Crop Uses**

By DR. FRANK THONE

KING COTTON is dead—so they say.

Economists of the more pessimistic persuasion, politicians who hope to make their own fortunes at his funeral, even some of the mournfuler kind of agricultural experts, have been holding his wake for several years.

The only thing wrong with these solemn festivities is that they have forgotten to invite the corpse.

For the white-headed monarch isn't dead yet, by a long shot. There's a scrap in the old boy yet.

True, he's had tough going, of late. He's had a remarkable array of maladies—weevil, bollworm, root-rot, and a lot more—for which the doctors have at best found only partial cures. He has seen formidable efforts at secession on the part of some of his overseas dominions, with ingrate offspring of his own setting up competing kingdoms under alien flags. He has suffered losses at home, too: men out of jobs don't need cotton overalls; women wearing less than a fourth of the clothes their grandmothers wore, and insisting that their now more visible legs shall be glossy in rayon or silk. And so on—a whole series of troubles.

But two or three troubles, or even ten or twenty, do not make a funeral. Mushroom dynasties may collapse as quickly as they arise; but King Cotton's realm, like Rome, was not built in a day, and if it falls like Rome it will most likely be as long as Rome was in falling.

Fighting

Not that King Cotton's loyal retainers are letting their optimism make do-nothing standpatters of them. They realize that they are in a fight, and that as in any fight he who merely stands still with the idea of letting the battle win itself is just about as badly off as he who incontinently runs away. They are all up and doing, and in the very front rank of effectives stand the corps of scientists.

These scientists in King Cotton's army, in the U. S. Department of Agriculture, in State Experiment Stations all through the South, in universities and

commercial laboratories and textile mills and chemical plants, fight on a hundred fronts with a hundred weapons. Some of them seek to make cotton better and stronger than it ever was before, and thereby improve its competitive position with regard to other fibers. Others seek new uses for cotton "as is," because they realize that improved cottons must have time in which to be developed and distributed among the millions of growers. Still other scientific supporters of Dixie's ancient King are trying to find ways of cheapening mass production, especially by the use of machine methods to replace hand labor which is always expensive even at starvation wages.

If even a few of these efforts succeed, the millions of King Cotton's dependents will have cause for rejoicing, and all of us will receive at least indirect benefits in returning prosperity and better cotton goods.

The newest move in the campaign to give American cotton new technical and economic advantages is the production of a unique and promising hybrid, by scientists of the U. S. Department of Agriculture. Not only cotton technicians

but leading cotton manufacturers are interested—even excited. One such manufacturer declared that for his business "It is the dawn of a new era!"

The story of the new hybrid cotton has more than a little romance in it—the romance of a Cinderella among plants. Of a Cinderella who really had little to recommend her, yet who concealed, among a lot of faults, one high redemptive quality.

Hopi cotton, raised by the Hopi Indians on their reservation and by nobody else, is pretty poor stuff. It yields only a few pounds per acre, it drops its bolls before they mature, it is pretty generally worthless. Not even the most shiftless poor white or the most "triflin'" Negro, in the Cotton Belt, would plant Hopi.

Its one great virtue, neglected and overlooked for many years, is the extraordinary fineness of its short fibers, or "staple." Fineness of fiber seems to be closely correlated with strength. The strongest cotton hitherto in common use has been the Sea Island variety, which could be raised only in a very limited area in the Southeast.

Because the staple of Sea Island cotton was longer than that of any other commercial variety, it used to be thought that its strength was due to the great fiber length. But Dr. R. S. Webb of the



FATE IN DOUBT

Some of King Cotton's humbler subjects. What is to become of them if cotton-harvesting becomes a machine job?



NEW POSSIBILITIES

The Rust cotton-picking machine is towed through a cottonfield by the cotton-mule's successor, a tractor. This rear view shows the row of spindles.

U. S. Department of Agriculture disproved this notion by cutting Sea Island fibers to the length of ordinary upland cotton fibers and then spinning them. The Sea Island thread was still much the stronger.

That left fineness of fiber as the alternative explanation of strength. Search was begun for a fine-fibered short-staple cotton, to be crossed to advantage with the more abundant-yielding upland cottons.

Dr. T. H. Kearney, also of the Department of Agriculture, thought of Hopi cotton, fine-fibered but otherwise an agronomic outcast. From a small sample available a thread was spun. Tests demonstrated conclusively that great strength did go with its great fineness. It was almost impossible to break it in the Department's fiber-strength testing machine.

Crossed with Acala

For this one virtue, then, Hopi was mated with Acala, a superior upland cotton, widely cultivated all the way from southern California to the Carolinas. First crosses, now in the hands of Department plant breeders, display a high degree of the expected fine-fibered strength and high spinning quality. Crosses with other varieties are also being made, and their fibers tested.

It will be several years at best, Dr.

Webb warns, before seed of the new Hopi hybrids can be available for general planting. There are very few plants in existence this year, and they will all be needed for experimental purposes, further breeding, and the elimination of the less desirable lines of descendants. But in the end, a general improvement in American upland cottons is practically assured, with resulting advantage in the battle against increasing foreign cotton competition for favorable position in the world market.

Seek Outlets

In the meantime, of course, we still have the standard kinds of cotton with us, and another group of Department of Agriculture workers, collaborating with State research men and industrialists, are searching every possible nook and corner for new outlets for cotton. Some of the possibilities are brand-new things, some are improvements of old ways, others are efforts to adapt cotton to uses now monopolized by other materials.

Certain new uses in the past have not had to be hunted for. They were "naturals"—large-scale industrial demands that actually hunted for the cotton, rather than the other way around. Automobile tires, for example, have made a market for millions of bales, that did not exist at all a little over a

generation ago. And soon cotton in the tires was joined by cotton on the seats, as leather proved both too expensive and not particularly satisfactory. And now cotton gets a third chance at the auto industry, in dissolved form, as a base for the "plastics" that lacquer the body and coat the leather-like fabrics of the upholstery.

That new plastics industry, which makes everything from sheer hose and ivory-like toilet articles for milady to knobs and gearwheels for factories, is using up a lot of cotton, and particularly of "linters," the once-useless downy fluff that clings to the cotton seed after the long fibers have been ginned off. Of course, this "chemical cotton" has to face the competition of chemical wood pulp, for any good grade of cellulose is grist for the plastic-maker's mill. But cotton gets its share, at least, of this business.

Airplane Wings

As the automobile made new business for cotton, so does the motorcar's winged brother, the airplane. Cotton fabric goes on airplane wings and bodies, which are coated with a "dope" that may be made of dissolved cotton. Cotton parachutes are used now, where once silk was thought to be the only suitable parachute material. Cotton fabric forms the enormous "cells" in Zeppelins, that hold the lifting gas. Finally, when an airplane lands in future airports, it may literally land on a field of cotton. Not the kind of cotton-field that Tin Pan Alley minstrels always mix in with Mammy and Alabammy when they slam the old pianny, but a field with runways stabilized and strengthened with cotton fabric under the tarmac. Cotton roads built in this way are already under extensive test in the South.

The annual campaign of cotton has always been carried on largely by what might be termed cotton infantry—a tremendous army of hand laborers in the fields, "chopping cotton" through the summer and picking it in the fall. It is back-breaking work, not too well paid at best, yet it is the sole means of support of millions of our people, both white and colored. Machinery, which revolutionized the cotton industry from the harvested bolls onward, had not yet touched it in the field, as machinery touched and revolutionized the agriculture of the great grain belt.

But now it begins to look as though cottonfield artillery were going to move into position at last. After scores of others had failed in efforts to invent a



MEASURING STRENGTH

A cotton-testing machine at the U. S. Department of Agriculture, Washington, D. C. A little bundle of fibers to be tested is clamped in the holder alongside the operator's left hand, and pulled until it breaks. Its "breaking strength" thus determined is read off on the dial.

practical cotton-picking machine, the Rust brothers, of Memphis, have developed one that looks as though it will work. Instead of the complicated and expensive arrangements of hooks and barbs that made other machines failures, they use smooth wire spindles, kept moist with water, that twist the fluffy cotton right out of the pod. Two men, with a tractor and one of the Rust machines, are said to be able to harvest as much cotton in a day as a pair of skilled pickers formerly could in a whole season.

It has not all been smooth sailing. Earlier models of the picker got the cotton, to be sure, but they also took too many leaves. Leaves in baled cotton either dry out and crumble as "leaf trash" or undergo wet decay and make spoiled spots in the cotton in that way. The inventors have been working hard to "get the bugs out" of their machine.

A different method for eliminating hand-picking of cotton is advocated by Dr. Frank K. Cameron of the University of North Carolina. He says that the cotton country of his state is too hilly for the use of picking machines, and believes that the only salvation of the oldest cotton states lies in their going "whole hog" in the matter of producing

"chemical cotton." His scheme is to cut the whole plant, stalk, leaves, bolls and all, with a mowing machine, dry and bale it like hay, and grind the whole business to pulp for the plastics manufacturers, after extracting the oil.

Of course, if the vast army of cotton-field hands lose their jobs as a result of the Rust system, the Cameron system, or any other method of mass handling of the crop, there is going to be a lot of social adjusting necessary. The Rust brothers realize this, and are trying to figure out a way of making their

machine support the population instead of pressing the poorest into still worse poverty. Their machine may make them barons in the realm of King Cotton, but they desire above everything else to avoid the stigma of being robber barons. Their social invention will be watched with even keener interest than men turn on their mechanical invention.

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Science News Letter, October 10, 1936

PHYSIOLOGY

Bad Weight Distribution Blamed For Foot Troubles

By DR. DUDLEY J. MORTON, Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University.

THE MAIN reasons for foot troubles are these: First, civilization; second, over-use; third, improper weight distribution.

The common types of arch and foot troubles are essentially town and city ailments. They do not prevail in rural and primitive conditions. Hard floors and pavements, jobs which require long hours of standing, economic pressure which keeps the individual going when signs of foot trouble have appeared—these are serious factors when a person has feet that are susceptible to disorder, though they do not affect people with more perfectly designed feet.

As for over-use, the capabilities of everybody's feet are not the same. This was recognized in selection of recruits in the War, for during their physical examination men with imperfect feet were assigned to a group designated Selective Service. They were then allotted to branches of service which did not include long hours of drill and marching. No such plan is followed in civil life. Many young people get started in work or trades which their feet are not fitted for, and they find this out too late. They must either continue with a progressing foot disability, that soon brings their economic usefulness to an end, or else start in some new line—sacrificing all the advantages of their previous experience.

Improper weight distribution, the third factor, is the most fundamental cause of functional foot troubles, and

the underlying cause of all of them.

Body weight is supported, of course, by the bones of the feet. In back, there is one big heel bone; but in front the weight has to be divided between five relatively slender bones, called the metatarsals. They extend from the middle of the instep to the base of each toe.

If body weight is properly shared by each of these bones the foot functions normally. If, however, the stresses of body weight are concentrated on a single one its joints are liable to become irritated and inflamed from the strain.

To learn how weight is normally distributed on these metatarsal bones, special instruments were devised. We found that in standing, each metatarsal bone bears about the same amount of weight except the first one, located behind the big toe. It is larger and stronger and carries a double share, twice as much as each of the others.

In walking or running, the entire weight of the body is thrown forward and swings toward the front ends of the first and second metatarsal bones which act together as the fulcrum of the foot's leverage action. These are normal conditions.

What happens when we have foot troubles? In every such case we found that these conditions of weight distribution were changed, and that the reason was located in the large first metatarsal bone. Either its ligaments were lax, or the bone itself was too short.

When the ligaments to the big first metatarsal bone are lax, it is unable to have a firm supporting contact with the ground, so that its double load falls on the weaker metatarsal next to it and behind the second toe, and the workings

of the foot become badly disorganized. It is this type of fault that leads to disorders of the main arch along the inner border of the foot.

When the first metatarsal bone is short, this affects the foot especially in active functions such as walking or running, when the foot is used as a lever. Such a foot can be identified by its appearance, because, for one thing, the second toe is invariably longer than the great toe. Another common sign is the pressure of callus on the sole of the foot, just behind the second and third toes.

There is no such thing as an anterior metatarsal arch. It is an erroneous concept we have inherited from the past century. The pains and calluses that have been blamed upon a "falling of such an arch" are really due to the uneven distribution of body weight upon these bones we have been mentioning.

In order to reestablish normal function in such cases it is necessary to know the nature and position of the underlying fault. Efficient care has been given to such cases by the prevailing methods of treatment which include strapping, arch supports, rest periods, and special exercises. But from these studies there has been a new and very simple method developed which applies directly to a correction of disordered weight distribution. This is simply an extension on a light insole that forms a platform under the first metatarsal bone. It raises the supporting surface of the ground to a level that makes the bone perform its normal duties, and by so doing relieves the strain of uneven weight distribution and inhibits the growth of painful callus.

This new method of treatment has been used on many cases as part of our scientific investigations during the past ten years. The research work on which it is based has only recently been published in completed form, in *The Human Foot* (Columbia University Press).

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There are waltzing rats, as well as waltzing mice.

CHEMISTRY

Power-Alcohol Plant Now In Commercial Production

AMERICA'S first power alcohol plant is producing new fuel for motor cars. Two batches of anhydrous ethyl alcohol made from corn, totaling 2,000 gallons, have poured from the stills of the Chemical Foundation-sponsored plant of the Bailor Manufacturing Company, Atchison, Kansas.

Officials expressed themselves as pleased with the performance of the new plant and predicted that in a month the capacity of 10,000 gallons a day would be realized.

Alcohol-blended gasoline under the name of agrol will be on sale shortly in seven midwestern states at prices that will compete on a quality basis with straight gasoline fuels. The production of power alcohol from surplus farm products in this plant is being watched by leaders in agriculture, the oil industry and other fields, including government, because it is a practical demonstration of the Farm Chemurgic Council's thesis that crops from American soil can be utilized for manufacture of industrial materials.

The Atchison plant also produces butyl as well as ethyl alcohol and as a valuable by-product dries the spent mash into a protein feed for stock. The butyl alcohol is used in connection with the ethyl alcohol production.

The ethyl alcohol, the same stuff that gives the kick to liquor, is used blended with gasoline to produce motor fuel. The whole output of the Bailor plant is being taken by the Chemical Foundation of Kansas for distribution at a price not to exceed 25 cents a gallon.

At the plant the alcohol is denatured and then blended with an equal volume of a petroleum to make what is called "agrol fluid." This blend will be used by filling station operators to make three grades of agrol gasoline, known as agrol 5, agrol 10, and agrol 15. These numbers indicate the quantity of alcohol in each of the standard blends when 60 octane gasoline is taken as the base fuel. If the filling station uses higher octane gasoline, less agrol fluid is needed, and if lower octane gasoline is the base, more agrol fluid is blended.

The oil industry is quite naturally watching closely the operation of the new plant and the distribution experience. In an article in the current *Oil*

and Gas Journal, W. T. Ziegenhain tells how the economies of power alcohol-gasoline blends will work out. The anti-knock value of base fuel, he explains, is raised one number for each one per cent of alcohol added to the 60 octane base fuel. Mr. Ziegenhain explains how an Omaha distributor might figure his relative cost. He pays 25 cents a gallon for the alcohol at the Atchison plant in the form of agrol fluid, and adds one cent freight charge. The present delivered cost of 60-octane refinery gasoline at Omaha is about seven and a quarter cents. If nine parts of this fuel are blended with one of alcohol, the resulting 70 octane blend costs nine and one-eighth cents. Regular 70-octane refinery gasoline is selling at Omaha for about eight and one-half cents. Large quantities of gum-solvent refinery gasoline is selling in the same area for one cent premium. The alcohol blend would fall in this classification and Mr. Ziegenhain believes that "the marketer might be attracted to the alcohol blend and the potential competition made real." The Atchison plant is believed by its officials to be the only commercial alcohol plant that has attempted to produce both butyl and ethyl alcohols and protein feed commercially in its initial operation.

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CHEMISTRY

Agriculture Department Studies Power Alcohol

MORE research upon the possibility of making power alcohol from farm products is being undertaken by the U. S. Department of Agriculture as the result of the Midwest's increasing interest in practical aspects of converting corn and other surplus or waste agricultural materials into stuff that will help run autos.

P. Burke Jacobs, formerly in charge of the Bureau of Chemistry and Soils' industrial farm products research laboratory at Ames, Iowa, is investigating intensively power alcohol production.

The new inquiry is a part of the general research on agricultural by-products being conducted by the Bureau of Chemistry and Soils.

Department of Agriculture scientists

● RADIO

October 13, 3:15 p.m., E.S.T.

SOIL AND SOCIOLOGY—Prof. Paul B. Sears of the University of Oklahoma.

October 20, 3:15 p.m., E.S.T.

SCIENCE AND HOUSE PLANTS—W. R. Beattie, Senior Horticulturist, U. S. Bureau of Plant Industry.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

are watching with interest the power alcohol plant built by the Chemical Foundation and the Farm Chemurgic Council at Atchison, Kans.

The making of motor fuel from crops grown on farms has been urged by the Farm Chemurgic Council movement. As a result there is wide support for this project in the agricultural sections, particularly in the corn states.

Both the policies of the U. S. Department of Agriculture and the Republican party are considered to be favorable to the continuation of intensive research of possible industrial use of farm products. Recently research possibilities compiled by the Farm Chemurgic Council were issued in a press release by Secretary of Agriculture Wallace.

The possibility that "new applications of alcohol, processed from the products of the soil, may increase the usefulness of the internal combustion engine" was mentioned by President Roosevelt in his recent World Power Conference address.

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CHEMISTRY

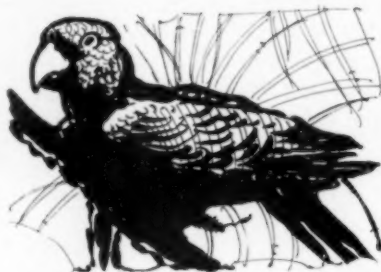
Dr. Bergius Defends Power Alcohol Popularity

DENYING that alcohol blended gasoline is losing favor in Germany, Dr. Friedrich Bergius predicts that "a proper blend of ethyl (grain) alcohol, methyl (wood) alcohol, benzene and gasoline bears promise of supplying the world with the ideal motor fuel for internal combustion engines."

Dangerous carbon monoxide in the exhaust gases would be reduced to the vanishing point by this properly blended fuel, Dr. Bergius contended in his statement issued by the Farm Chemurgic Council, protagonists for power alcohol made from farm products.

The Bergius opinion is considered a reply to a recent U. S. Bureau of Foreign and Domestic Commerce report that alcohol blended motor fuel was losing popularity in Germany. Dr. Bergius explained that the German situation with regard to farm products is now quite different from that in the United States and that there is a smaller surplus of potatoes and other starch and sugar crops from which power alcohol in Germany can be made. He does not expect synthetic gasoline made from coal by his process to conflict with power alcohol since 20 to 25 per cent, twice the amount now usually blended, could be utilized effectively in Germany if the alcohol were available.

Science News Letter, October 10, 1936



A Spoon For Each Dish

THE bewildering array of silverware that confronts you at a banquet has its counterparts in the natural world. Animal jaws, insect mouthparts, bird beaks are often even more specially adapted to one particular kind of food or drink than are the bouillon spoons, salad forks, or meat knives that lie in a glittering row on the table.

Parrots and their kin the parroquets, for example, have first-class fruit-knife beaks. They are largely fruit- and seed-eaters, and their tools are forged accordingly, with strong points to break through tough skins, and a broad, sharp blade on each side, for cutting.

Beaks of the meat-eating hawks and eagles are sometimes said to be like those of parrots, but the resemblance is only of the most general and superficial kind. They resemble the fruit-cutting kind of beak about as much as a steak-knife resembles a fruit-knife. And the beaks of their less fastidious cousins, the buzzards and vultures, being used only on carrion, need not be so sharply pointed or well whetted as are the highly developed flesh-hooks of the true birds of prey.

Beaks of birds like crane and stork, and on a smaller scale the snipes and sandpipers, are something between forks and forceps, for they can plunge into the dish to get their tidbit, but they pick it up by seizing it instead of spearing it.

Of spoon-like beaks there are a plenty, and they are used like spoons, too. Ducks are an outstanding example. They can "snobble" up grain from dry ground, as you might spoon popcorn out of a bowl, or they can go nuzzling along a pond bottom, scooping up worms, crayfish, plant tubers, and whatever other edible tidbits there may be in this natural "duck soup."

There are, of course, freak beaks, just as there are freak knives and forks and spoons. Nobody can imagine why such birds as the hornbill and the toucan should have received the doubtful blessings of oversized feeding organs. Nor why the spoon of the flamingo should have been so bent that the bird has to stand on its head and use its beak upside-down.

Omnivorous man, with his array of ingenious metal "beaks," can feed on a thousand things, but the birds, given only one feeding-utensil apiece, have to stick pretty much to one course all their lives. It is only the ones with the generalized beaks, like robins and barnyard hens, that can manage a highly varied diet, like unfashionable folk who have only a minimum of "eatin' tools."

Science News Letter, October 10, 1936

PALEONTOLOGY

African Ape Fossils Not So Old as First Thought

FURTHER details now available on the important great-ape fossil discovery in South Africa by Dr. R. Broom of the Transvaal Museum indicate that the skull is probably not as ancient as the Australopithecus fossils found twelve years ago in a different locality in South Africa, though it still belongs to the same genus or general group of primate animals (See SNL, Oct. 3).

In his report (*Nature*, Sept. 19), Dr. Broom states, "I think the Taungs deposit will probably prove to be Lower or Middle Pleistocene, while the Sterkfontein deposit is most probably Upper Pleistocene. I therefore think it advisable to place the new form in a distinct species, though provisionally it may be put in the same genus as the Taungs ape."

This means that both specimens are of animals that lived during the Ice Age, rather than before it—a difference in time of a million years at the very least. It also means that they lived after man had appeared. These particular specimens therefore could not have been a part of man's ancestry, though Dr. Broom regards Australopithecus as on or near the human line of descent.

The estimated size of the brain of the new specimen is 600 cubic centimeters, considerably larger than that of the average gorilla. The average white man's brain measures about 1,400 cubic centimeters, and the smallest normal human brain was about 1,100 cc.

Science News Letter, October 10, 1936

'First Glances at New Books

Additional Reviews
On Page 240

Agricultural Economics

RICH LAND—POOR LAND—Stuart Chase—*Whittlesey House*, 361 p., \$2.50. Stuart Chase is not the first to preach wrath to come (and partly already here!) as the result of America's reckless waste of the land and its resources. But whatever Stuart Chase re-tells gains color and force in the re-telling. This book is a vivid, dramatic, often appalling presentation of the story of our career to the brink of national bankruptcy through our own undisciplined selfishness. Yet like all the other prophets of today, Mr. Chase tells us there is yet time, that we can draw back from the brink—if we have the national will to self-discipline, which must underlie any success in national planning.

Science News Letter, October 10, 1936

Pets

DOGS: THEIR CARE AND TRAINING, BREEDS AND SELECTION—Alfred W. Meyer—*Whittlesey House*, 268 p., \$2.50. Somewhat over half this book is concerned with the diseases of dogs and their treatment: it is a bit disconcerting to reflect that so many things can go wrong with the fine animals described and pictured in the rest of the text; but at the same time useful to have information as to what to do about it so clearly and thoroughly presented.

Science News Letter, October 10, 1936

Physics

THE PHYSICAL WORLD—Louis M. Heil—*Blakiston's*, 566 p., 426 illus., \$2.75. A text for use in the newer type of cultural science course for students who wish to know something of physics, yet who must not be frightened away by mathematical formulae. The physical principles underlying astronomy, physics and chemistry form the backbone of this book. A splendid collection of unusual textbook illustrations add value.

Science News Letter, October 10, 1936

Biology

A LABORATORY MANUAL IN GENERAL BIOLOGY—James W. Mavor and Leonard B. Clark—*Macmillan*, 201 p., \$1.75.

Science News Letter, October 10, 1936

Sociology

REGIONAL PLANNING—PART II—ST. LOUIS REGION—68 p., 25c.—**PART III—NEW ENGLAND**—101 p., 30c.—National Resources Committee — *Govt. Print. Off.* Careful studies of problems

in human ecology in two strongly diverse areas, the one a municipality at a very important river-pass; the other an old, highly developed geographic unit which is having to undergo some very decided changes—and is not finding the changing too easy. Both publications present material of intense interest to the student of any phase of human affairs.

Science News Letter, October 10, 1936

Biology

COLOR CHANGES OF ANIMALS IN RELATION TO NERVOUS ACTIVITY—G. H. Parker—*Univ. of Pennsylvania*, 74 p., \$1.50. An extension of the Leidy Memorial Lecture for 1936 into a slender volume giving an admirable brief summation of the principal facts now available on one of the most interesting of biological phenomena.

Science News Letter, October 10, 1936

Photography

COLOUR CINEMATOGRAPHY—Adrian Bernard Klein—*American Photographic Publishing Co.*, 350 p., \$7. The modern world is becoming constantly more colorful, and this book on motion pictures in color is a valuable compilation both historically and with relation to modern methods and processes.

Science News Letter, October 10, 1936

Chemistry

ELECTROLYTIC OXIDATION AND REDUCTION: INORGANIC AND ORGANIC—S. Glasstone and A. Hickling—*Van Nostrand*, 420 p., \$9.50. Volume 9 of the British series of monographs on applied chemistry.

Science News Letter, October 10, 1936

Physics

THE REVOLUTION IN PHYSICS—Ernst Zimmer—*Harcourt, Brace*, 240 p., \$3.75. Ernst Zimmer may be an unknown name to many American readers but a praising foreword by Max Planck authenticates this penetrating book. The "revolution" in physics refers to the aspects of the new discoveries as they affect modern thought and philosophy rather than the changes in physical and chemical technology which have already borne marvelous fruits. The main point of the revolution is the passing of the old concept, which was that every problem in every field, including the social sciences, could be treated as a technical problem in straight physics. Man can no longer regard nature, life and his civilization as a fixed thing obeying predetermined laws. If the world considered as a vast complex machine was an illusion of our fathers, how was the illusion produced? And what lies ahead? Herr Zimmer goes far toward supplying the answers.

Science News Letter, October 10, 1936

Meteorology

MANUAL OF METEOROLOGY, VOLUME II, COMPARATIVE METEOROLOGY—Sir Napier Shaw—*Cambridge (Macmillan)*, 472 p., \$10. A thoroughly scholarly presentation of a very important aspect of weather science, yet not too technical for the serious though non-professional reader to study with profit and even with pleasure. The many scores of maps, charts, diagrams, and tables aid materially in the presentation. A feature of particular value and interest is the thorough discussion of air mass analysis.

Science News Letter, October 10, 1936

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Additional Reviews
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Plant Physiology

GROWTH HORMONES IN PLANTS—P. Boysen Jensen, Trans. and rev. by George S. Avery, Jr. and Paul R. Burkholder with the collaboration of Harriet B. Creighton and Beatrice A. Scheer—*McGraw-Hill*, 268 p., \$3.50. Growth substances in plants are such a recent discovery, and their physiology such a rapidly developing subject of investigation, that the literature on the subject has been very badly scattered, with some of the most important papers difficult of access, or escaping attention because obscurely published. The author and the translators of this volume therefore merit the gratitude of all plant physiologists, and of biologists generally, for making so much of the foundation-material available in one not-too-thick volume.

Science News Letter, October 10, 1936

Meteorology

AN INTRODUCTION TO THE STUDY OF AIR MASS ANALYSIS—Jerome Namias and others—*American Meteorological Society*, 84 p., 50c to members and in bulk, 60c to others. A valuable treatment of the latest methods in weather forecasting. Air mass analysis contains the hope of longer range weather forecasting.

Science News Letter, October 10, 1936

Science

SCIENCE INTERESTS—Frederick L. Fitzpatrick—*Teachers College, Columbia Univ.*, 72 p., 80c. Educators are giving consideration to the interests, likes or dislikes of students as an aid to determining what they should study or what they should do in later life. This inquiry summarizes methods of determining "interest" and concludes that testimony of the pupils themselves is an inadequate index.

Science News Letter, October 10, 1936

Cinematography

SOUND EQUIPMENT, MOTION PICTURE PROJECTION, PUBLIC ADDRESS SYSTEMS—James R. Cameron—*Cameron Publishing Company*—336 p., \$5. A valuable handbook for those who operate sound equipment.

Science News Letter, October 10, 1936

Geology

HISTORICAL GEOLOGY—Walter A. Ver Wiebe—*John S. Swift Co.*, 316 p., \$3. This text is unique in several respects. In the first place, it is plano-

graphed rather than printed, necessitating considerable thought and care in making the illustrations as diagrammatic and clear as possible—an advantage in itself. Even more important is the author's departure from the usual order of presentation "from the bottom up." Prof. Ver Wiebe reverses, beginning with the Quaternary and digging down through each age in turn until he reaches the Archeozoic. The result is calculated to be of greater interest to beginning students.

Science News Letter, October 10, 1936

History—Sociology

THE FOUNDATIONS OF CIVILIZATION—Will Durant—*Simon and Schuster*, 211 p., \$1. A reprint of the introduction of the author's more extensive work, *The Story of Civilization*, which appeared last year.

Science News Letter, October 10, 1936

Sociology

PROGRESS REPORT OF THE NATIONAL RESOURCES COMMITTEE, June 15, 1936—*Natl. Res. Comm.*, 61 p., 25c. Considering the tremendous physical magnitudes of the problems to be attacked, and the obstinate local interests that frequently have to be met, there has been a surprising and gratifying amount of progress in a single year's work, as reported in this publication.

Science News Letter, October 10, 1936

Psychology

GENERAL PSYCHOLOGY—David B. Klein—*Holt*, 560 p., \$2.50. A text intended for those who desire only a general cultural orientation in the field as well as for those who intend to major in this science. It is written by the professor of psychology in the University of Texas.

Science News Letter, October 10, 1936

Botany

COMMON MUSHROOMS—Leon L. Pray—*Field Museum of Natural History*, 68 p., 75c. A compact, very well illustrated booklet on the species of mushrooms most likely to be encountered in ordinary country or woodland walks.

Science News Letter, October 10, 1936

Physics—Philosophy

THE PHILOSOPHY OF PHYSICS—Max Planck—*Norton*, 128 p., \$2. Prof. Planck's views on how the science of physics affects the philosophical thinking of men merit thoughtful consideration. Any philosophy, he points out, must include the inanimate natural things that the physicist studies. Some religious dogmas, says Prof. Planck, have fallen because they failed to do this. But physics affects philosophy in a positive sense also because the vast fruits of exact science in technological applications have made it, rightly or wrongly, a model for other fields of study. The point which Prof. Planck explains in detail is that the philosophy of a student of physics will influence his scientific work and conversely his studies affect his philosophy.

Science News Letter, October 10, 1936

General Science

THE TREE OF KNOWLEDGE—Colored reproduction of mural by John Norton, size 25" x 38"—*Museum of Science and Industry*, Chicago. 25c per copy; 20c for each additional copy. Suitable for framing and hanging on wall of classroom or study.

Science News Letter, October 10, 1936

Poultry Husbandry

EGG FARMING—Willard C. Thompson—*Orange Judd*, 335 p., \$2. Making a living by keeping chickens is not a simple and easy matter—as many a hopeful amateur has expensively learned. The practical and thorough discussion of the whole business given in this book will be illuminating to many who contemplate entering it, and helpful to those already engaged in it.

Science News Letter, October 10, 1936

Chemistry

A POCKET BOOK FOR CHEMISTS, CHEMICAL MANUFACTURERS, METALLURGISTS, DYERS, DISTILLERS, BREWERS, SUGAR REFINERS, PHOTOGRAPHERS, STUDENTS, ETC. Ninth ed.—Thomas Bayley—*Chemical Publishing Co.*, 460 p., \$3.50. British small-scale equivalent of the American Handbook of Physics and Chemistry.

Science News Letter, October 10, 1936

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